

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : <b>C11D 17/00, 10/04, A61K 7/48</b>	<b>A1</b>	(11) International Publication Number: <b>WO 98/27193</b> (43) International Publication Date: <b>25 June 1998 (25.06.98)</b>
(21) International Application Number: <b>PCT/US97/22575</b> (22) International Filing Date: <b>9 December 1997 (09.12.97)</b> (30) Priority Data: <b>08/767,494</b> <b>16 December 1996 (16.12.96)</b> <b>US</b> (71) Applicant: <b>THE PROCTER &amp; GAMBLE COMPANY</b> <b>[US/US]; One Procter &amp; Gamble Plaza, Cincinnati, OH</b> <b>45202 (US).</b> (72) Inventors: <b>SINE, Mark, Richard; 2631 East U.S. 22 and 3,</b> <b>Morrow, OH 45152 (US). DEMOSS, David, Allen; 9827</b> <b>Dunraven Drive, Cincinnati, OH 45251 (US). WEI, Karl,</b> <b>Shiqing; 4600 Cobblestone Court, Mason, OH 45040 (US).</b> <b>CLAPP, Mannie, Lee; 8097 Village Drive, Montgomery,</b> <b>OH 45242 (US).</b> (74) Agents: <b>REED, T., David et al.; The Procter &amp; Gamble</b> <b>Company, 5299 Spring Grove Avenue, Cincinnati, OH</b> <b>45217 (US).</b>	(81) Designated States: <b>CN, MX, European patent (AT, BE, CH,</b> <b>DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT,</b> <b>SE).</b>  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the</i> <i>claims and to be republished in the event of the receipt of</i> <i>amendments.</i>	

(54) Title: **PERSONAL CLEANSING BAR COMPOSITION CONTAINING SODIUM LAUROYL LACTYLATE**

## (57) Abstract

The present invention relates to lathering and moisturizing personal cleansing bar compositions which comprise 1) from about 10 % to about 50 % by weight of the composition of a rigid semi-continuous, interlocking open mesh crystalline network structure comprising fatty acid soap, and 2) an unstable emulsion contained within the interstices of the open mesh crystalline structure. The unstable emulsion comprises a moisturizing phase and an aqueous cleansing phase. The moisturizing phase of the emulsions employed in the personal cleansing bar compositions of the present invention comprises from about 5 parts to about 40 parts by weight of the composition of a lipid skin moisturizing agent. The aqueous cleansing phase comprises (a) from about 1 part to about 50 parts by weight of the composition of a surfactant comprising a lathering synthetic surfactant; (b) from about 0.5 % to about 40 % parts by weight of the composition of a co-surfactant comprising sodium lauroyl lactylate, and (c) from about 10 parts to about 50 parts by weight of the composition water.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
CA	Canada	IS	Iceland	MX	Mexico	US	United States of America
CF	Central African Republic	IT	Italy	NE	Niger	UZ	Uzbekistan
CG	Congo	JP	Japan	NL	Netherlands	VN	Viet Nam
CH	Switzerland	KE	Kenya	NO	Norway	YU	Yugoslavia
CI	Côte d'Ivoire	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CM	Cameroon	KP	Democratic People's Republic of Korea	PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

PERSONAL CLEANSING BAR COMPOSITION CONTAINING SODIUM LAUROYL LACTYLATE

**TECHNICAL FIELD**

The present invention relates to lathering personal cleansing bar compositions which provide improved moisturization benefits to the skin. The compositions of the present invention contain sodium lauroyl lactylate as a co-surfactant.

**BACKGROUND OF THE INVENTION**

Moisturizers are usually applied directly to the skin as leave-on products. Personal cleansing products are usually applied with water as a foam or lather and rinsed off with clear water. Rinse off personal cleansers should cleanse the skin gently, causing little or no irritation without defatting and/or drying the skin and without leaving skin taut after frequent use. Ideally, rinse-off personal cleansing compositions should additionally provide a moisturizing benefit to the skin, similar to the benefit currently obtained from leave-on moisturizers.

Personal cleansing products which provide both a cleansing and a moisturizing benefit to the skin are becoming increasingly known in the art. However, consumers would prefer that an even greater moisturizing benefit be provided from rinse-off, personal cleansing products than is realized from currently marketed products.

It is known that lactic esters of fatty acids can function to aid emulsion formation and detergency in personal cleansing products. U.S. Pat. No. 4,761,279 discloses soapless and non-detergent shaving cream formulation containing salts of fatty acid esters of lactic acid. U.S. Pat. No. 4,822,601 discloses cosmetic compositions with therapeutic properties, which compositions contain acyl fatty acid lactylate ester or alkali metal salt. U.S. Pat. No. 4,846,991 discloses novel lactic acid esters of an  $\alpha$ -branched fatty acid possessing an excellent hair conditioning effect. WO No. 960225 discloses an aqueous liquid cleansing and moisturizing composition containing alkyl lactylate as a benefit agent.

It has now been found that moisturizing and cleansing bar compositions which contain sodium lauroyl lactylate as a cosurfactant can provide improved moisturizing benefits to the skin while maintaining the lathering, sensory and cleansing properties of the product.

**SUMMARY OF THE INVENTION**

The present invention relates to lathering and moisturizing personal cleansing bar compositions which comprise 1) from about 10% to about 50% by weight of the composition of a rigid semi-continuous, interlocking open mesh crystalline network structure comprising fatty acid soap, and 2) an unstable emulsion contained within the interstices of the open mesh crystalline structure.

The unstable emulsion comprises a moisturizing phase and an aqueous cleansing phase. The moisturizing phase of the emulsions employed in the personal cleansing bar compositions of the present invention comprises from about 5% to about 40% by weight of the composition of a lipophilic skin moisturizing agent having a Vaughan Solubility Parameter ranging from about 5 to about 10 and having a consistency,  $k$ , of less than 5,000 poise. The aqueous cleansing phase comprises (a) from about 1% to about 50% by weight of the composition of a surfactant comprising a lathering synthetic surfactant; (b) from about 0.5% to about 40% parts by weight of the composition of a cosurfactant comprising sodium lauroyl lactylate, and; (c) from about 10% to about 50% by weight of the composition water.

### DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to lathering and moisturizing personal cleansing bar compositions which provide superior moisturization to the skin. The personal cleansing bar compositions of the present invention comprise 1) from about 10 to about 50% by weight of the composition of a rigid semi-continuous, interlocking open mesh crystalline network structure comprised of fatty acid soap, and 2) an unstable emulsion contained within the interstices of the open mesh crystalline network structure.

The unstable emulsion comprises a moisturizing phase and an aqueous cleansing phase. The moisturizing phase of the emulsions employed in the personal cleansing bar composition of the present invention from about 5% to about 40% by weight of the composition of a lipophilic skin moisturizing agent having a Vaughan Solubility Parameter ranging from about 5 to about 10 and a consistency,  $k$ , of less than 5,000 poise. The aqueous cleansing phase comprises (a) from about 1% to about 50% by weight of the composition of a surfactant comprising a lathering synthetic surfactant, (b) from about 0.5% to about 40% by weight of the composition of a cosurfactant comprising sodium lauroyl lactylate, and (c) water.

Personal cleansing bar compositions of the present invention, including the material contained therein and processes for making them, are described in detail as follows:

#### I. Ingredients

##### A. The Unstable Emulsion

The personal cleansing bar compositions of the present invention contain an unstable emulsion which is contained within the interstices of the open mesh crystalline network structure. In order to deposit significant amounts of the lipophilic skin moisturizing agent on the skin, it is important that the emulsion employed in the bar compositions herein be relatively unstable. As used herein, an unstable emulsion means an emulsion which tends to break easily upon dilution in the bath or shower. The relative stability of the emulsion is determined by the Emulsion Stability Centrifuge Test set forth hereinafter in the Analytical Methods Section.

The emulsions employed in the personal cleansing bar compositions herein contain a moisturizing phase and an aqueous cleansing phase. It is preferred that the ratio of the aqueous phase to the moisturizing phase in the compositions herein is greater than about 1:1, preferably greater than about 1.5:1. Each phase of the emulsion is described in detail as follows:

1. Moisturizing Phase

The emulsion employed in the personal cleansing bar compositions of the present invention comprises a moisturizing phase which comprises a lipophilic skin moisturizing agent or mixture of lipophilic skin moisturizing agents. In particular, the personal cleansing bar compositions of the present invention comprise from about 5% to about 40%, preferably from about 10% to about 40%, more preferably from about 10% to about 30% by weight of the bar composition of the lipophilic skin moisturizing agent. The lipophilic skin moisturizing agent provides a moisturizing benefit to the user of the personal cleansing product when the lipid moisturizing agent is deposited to the user's skin.

The lipophilic skin moisturizing agent used herein has certain physical and rheological characteristics. For example, the lipophilic skin moisturizing agent or mixture of lipophilic skin moisturizing agents employed herein preferably has a Vaughan Solubility Parameter (VSP) ranging from 5 to 10, more preferably from 5.5 to 9, as defined by Vaughan in Cosmetics and Toiletries, Vol. 103, p. 47-69, October 1988. The Vaughan Solubility Parameter of a lipophilic skin moisturizing agent is a calculated parameter used to define the solubility of a lipid.

The lipophilic skin moisturizing agent is further preferably comprised of particles ranging from about 0.1 microns to 100 microns, excluding anomalous very small or a few very large particles. While not being bound by any theory, the particle size of the lipophilic skin moisturizing agent can impact the user-perceived stickiness; with larger particles being perceived as more sticky. An example of a sticky lipid bar with large

lipid particles is disclosed in allowed U.S. Pat. Application Ser. No. 07/909,877, Kacher et al., filed July 7, 1992, incorporated herein by reference.

In a preferred embodiment of the present invention at least about 10%, preferably at least about 30%, more preferably at least about 40%, and most preferably at least about 50% by weight of the lipophilic skin moisturizing agent particles having a diameter of greater than about 10 microns in the bar lather are nonspherical, as determined by the % Nonspherical Particles Method set forth hereinafter in the Analytical Methods Section. For purposes herein, a particle is nonspherical if it has a aspect ratio (length divided by width) of greater than about 1.1. In general, the larger the number of nonspherical lipophilic skin moisturizing agent particles in the bar lather, the greater the deposition of the moisturizing agent on the skin. The nonspherical shape of the lipophilic skin moisturizing agent particles can be achieved by passing the particles through a static mixer.

Two types of rheological parameters are used to define the lipophilic skin moisturizing agent used herein. Consistency,  $k$ , and shear index,  $n$ , when used together, are a measure of the viscosity of materials, such as the lipophilic skin moisturizing agents herein, whose viscosity is a function of shear. While not being bound by any theory, it is believed that the consistency and the shear index of the lipophilic skin moisturizing agent herein represent the stickiness of the lipophilic skin moisturizing agent.

Lipophilic skin moisturizing agents useful herein have a shear index,  $n$ , ranging from about 0.1 to about 0.9, preferably from about 0.1 to about 0.5, more preferably from about 0.2 to about 0.5, as measured by the method set forth hereinafter in the Analytical Methods section and a consistency,  $k$ , of less than about 5,000 poise; preferably from about 5 to about 3000 poise; more preferably about 10 to about 2,000 poise at 35° C, as measured by the method set forth hereinafter in the Analytical Methods section.

The other type of parameter used herein, are the elastic modulus ( $G'$ ) and the viscous modulus ( $G''$ ). The elastic modulus is a measurement of the ability of the lipophilic skin moisturizing agent to store or return energy. The viscous modulus is a measurement of unrecoverable energy. While not being bound by any theory it is believed  $G'$  and  $G''$  are important factors determining the emulsification characteristics of a lipophilic skin moisturizing agent.

Lipophilic skin moisturizing agents useful herein also preferably have an elastic modulus,  $G'$ , ranging from about 25 to about 100,000 dynes/square centimeter, more preferably from about 1,000 to about 80,000 dynes/square centimeter, most preferably from about 5,000 to about 50,000 dynes/square centimeter, as measured by the method

set forth hereinafter in the Analytical Methods section, and a viscous modulus,  $G''$ , ranging from about 25 to about 500,000 dynes/square centimeter, more preferably from about 500 to about 300,000 dynes/square centimeter, and most preferably from about 5,000 to about 100,000 dynes/square centimeter, as measured by the method set forth hereinafter in the Analytical Methods section.

Lipophilic skin moisturizing agents or mixtures of lipophilic skin moisturizing agents which have rheological properties other than those described herein can be either too easily emulsified such that they will not deposit on the skin, or are too "stiff" to adhere or deposit on to skin and provide a moisturization benefit. In addition to the effect of the rheological properties of the lipophilic skin moisturizing agent on the ability of the lipophilic skin moisturizing agent to deposit on the skin, the rheological properties of the lipophilic skin moisturizing agent are also important to user perception. Some lipophilic skin moisturizing agents or mixtures of skin moisturizing agents, on deposition to the skin, are considered too sticky and are not preferred by the user.

Notwithstanding the preferred physical and rheological characteristics hereinbefore described for the lipophilic skin moisturizing agent, a wide variety of lipophilic skin moisturizing agents or mixtures of lipophilic skin moisturizing agents are suitable for use in the compositions of the present invention. Preferably, the lipophilic skin moisturizing agent is selected from the group consisting of hydrocarbons oils and waxes, silicones, fatty acid derivatives, cholesterol, cholesterol derivatives, di and tri-glycerides, vegetable oils, vegetable oil derivatives, and acetoglyceride esters, alkyl esters, alkenyl esters, lanolin and its derivatives, milk -tri-glycerides, wax esters, beeswax derivatives, sterols and phospholipids mixtures thereof.

Hydrocarbon oils and waxes: Some examples are petrolatum, mineral oil micro-crystalline waxes, polyalkenes, paraffins, cerasin, ozokerite, polyethylene and perhydrosqualene.

Silicone Oils: Some examples are dimethicone copolyol, dimethylpolysiloxane, diethylpolysiloxane, high molecular weight dimethicone, mixed C1-C30 alkyl polysiloxane, phenyl dimethicone, dimethiconol, and mixtures thereof. More preferred are non-volatile silicones selected from dimethicone, dimethiconol, mixed C1-C30 alkyl polysiloxane, and mixtures thereof. Nonlimiting examples of silicones useful herein are described in U.S. Patent No. 5,011,681, to Ciotti et al., issued April 30, 1991, which is incorporated by reference.

Di and tri-glycerides: Some examples are castor oil, soy bean oil, derivatized soybean oils such as maleated soy bean oil, safflower oil, cotton seed oil, corn oil, walnut oil, peanut oil, olive oil, cod liver oil, almond oil, avocado oil, palm oil and sesame oil,

vegetable oils and vegetable oil derivatives; coconut oil and derivatized coconut oil, cottonseed oil and derivatized cottonseed oil, jojoba oil, cocoa butter, and the like.

Acetoglyceride esters are used and an example is acetylated monoglycerides.

Alkyl esters can be used and some examples are: isopropyl esters of fatty acids and long chain esters of long chain fatty acids, e.g. cetyl ricinoleate are especially useful herein. Some examples of these are isopropyl palmitate, isopropyl myristate, cetyl riconoleate and stearyl riconoleate. Other examples are: hexyl laurate, isohexyl laurate, myristyl myristate, isohexyl palmitate, decyl oleate, isodecyl oleate, hexadecyl stearate, decyl stearate, isopropyl isostearate, diisopropyl adipate, diisohexyl adipate, dihexyldecyl adipate, diisopropyl sebacate, acyl isononanoate lauryl lactate, myristyl lactate and cetyl lactate.

Alkenyl esters are useful and some examples are oleyl myristate, oleyl stearate and oleyl oleate.

Lanolin and its derivatives are preferred and some examples are lanolin, lanolin oil, lanolin wax, lanolin alcohols, lanolin fatty acids, isopropyl lanolate, acetylated lanolin, acetylated lanolin alcohols, lanolin alcohol linoleate, lanolin alcohol riconoleate.

Milk glycerides are useful and an example is hydroxylated milk glyceride.

Polyol fatty acid polyesters are also useful.

Wax esters, such as beeswax and beeswax derivatives, spermaceti, myristyl myristate, stearyl stearate are also useful. Vegetable waxes are useful and some examples are carnauba and candelilla waxes. Sterols are useful and some examples are cholesterol, cholesterol fatty acid esters. Phospholipids, such as lecithin and derivatives, Sphingo lipids, ceramides, glycosphingo lipids are also useful.

In a preferred embodiment of the present invention, at least 70 % of the lipophilic skin moisturizing agent is selected from the group consisting of petrolatum, mineral oil micro-crystalline waxes, paraffins, ozokerite, polyethylene, polybutene, polydecene and perhydrosqualene. dimethicones, cyclomethicones, alkyl siloxanes, polymethylsiloxanes and methylphenylpolysiloxanes, lanolin, lanolin oil, lanolin wax, lanolin alcohols, lanolin fatty acids, isopropyl lanolate, acetylated lanolin, acetylated lanolin alcohols, lanolin alcohol linoleate, lanolin alcohol riconoleate castor oil, soy bean oil, maleated soy bean oil, safflower oil, cotton seed oil, corn oil, walnut oil, peanut oil, olive oil, cod liver oil, almond oil, avocado oil, palm oil and sesame oil, and mixture thereof.

## 2. Aqueous Cleansing Phase



The emulsions employed in the personal cleansing bar compositions of the present invention also comprise an aqueous cleansing phase which comprises a) a surfactant comprising a lathering synthetic surfactant, b) a cosurfactant comprising sodium lauroyl lactylate, and c) water.

a. The Lathering Synthetic Surfactant

The lathering synthetic surfactant is selected from the group consisting of anionic surfactants; nonionic surfactants, cationic surfactants, amphoteric surfactants, and mixtures thereof.

The lathering surfactant is defined herein as a surfactant or surfactant mixture thereof that when combined have an equilibrium surface tension of between 15 and 50 dynes/cm, more preferably between 25 and 40 dynes/cm as measured at the CMC (critical micelle concentration) at 25°C. Some surfactant mixes can have a surface tension lower than those of its individual components.

The personal cleansing compositions herein comprise from about 0.5% to about 50%, preferably from about 5% to about 40%, and most preferably from about 10% to about 35% of a lathering surfactant.

Anionic surfactants useful herein include: acyl isethionates, acyl sarcosinates, alkylglycerylether sulfonates, alkyl sulfates, acyl lactylate, methylacyl taurates, paraffin sulfonates, linear alkyl benzene sulfonates, N-acyl glutamates, alkyl sulfosuccinates, alpha sulfo fatty acid esters, alkyl ether carboxylates, alkyl phosphate esters, ethoxylated alkyl phosphate esters, alpha olefin sulphates, the alkyl ether sulfates (with 1 to 12 ethoxy groups) and mixtures thereof, wherein said surfactants contain C8 to C22 alkyl chains and wherein the counterion is selected from the group consisting of: Na, K, NH<sub>4</sub>, N(CH<sub>2</sub>CH<sub>2</sub>OH)<sub>3</sub>. The anionic surfactant is more preferred when selected from the group consisting of acyl isethionate, acyl sarcosinates, acyl lactylates, alkyl sulfosuccinates, alkylglycerylether sulfonates, methylacyl taurates, alkyl ether sulfates, alkyl sulfates, alkyl phosphate esters and mixtures thereof, wherein said surfactants contain has C8 to C14 alkyl chains and is present at a level of from about 8% to about 20%.

Amphoteric synthetic surfactants cannot serve as the sole surfactant in this product, but are preferred as a co-surfactant at a lower level of from about 1% to about 10%, by weight and the more preferred types are selected from alkyl-ampho mono- and di-acetates, alkyl betaines, alkyl dimethyl amine oxides, alkyl sultaines, alkyl amidopropyl betaines, alkyl amidopropyl hydroxysultaines, and mixtures thereof, wherein said surfactants contain C8 to C22 alkyl chains.

Nonionic synthetic surfactant cannot serve as the sole surfactant in this product, but can be used as a co-surfactant at a lower level of from about 1% to about 15% by weight. The more preferred types selected from the group consisting: alkyl glucose amides, alkyl glucose esters, polyoxyethylene amides, fatty alkane amides, alkyl amine oxides, alkyl polyglucosides, polyoxy ethylene alkyl phenols, polyoxyethylene esters of fatty acids, EO/PO block co-polymers such as polyoxamines and poloxamers, sorbitan esters and alcohol esters, and mixtures thereof.

Cationic synthetic surfactant cannot serve as the sole surfactant in this product, but are preferred as a co-surfactant at a lower level of from about 0.5% to about 6%, by weight. The more preferred types of cationic surfactants are selected from the group consisting: alkyl trimonium chloride and methosulfate, and dialkyldimonium chloride and methyl sulphate, and alkyl alkonium chloride and methyl sulphate and mixtures thereof. These surfactants contain C12 to C24 carbon atoms per alkyl chain. The most preferred cationic is selected from the group consisting of stearylkonium chloride, stearyltrimonium chloride, Di-stearyl-dimonium chloride, and mixtures thereof. Cationic surfactants may also act as a lipid deposition aid.

b. The Cosurfactant

Another essential element of the lathering and moisturizing personal cleansing bars of the present invention is a cosurfactant which is present in addition to the lathering synthetic surfactant hereinbefore described. The cosurfactant comprises sodium lauroyl lactylate and is present in the bar compositions herein at a level ranging from about 0.5% to about 40%, preferably from about 1% to about 20%, more preferably from about 1% to about 10%. It has been found that the use of sodium lauroyl lactylate cosurfactant with the lathering synthetic surfactant hereinbefore described helps to increase the deposition of the lipophilic skin moisturizing agents onto the skin and contributes to a moisturized skin feel.

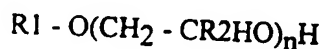
c. Water

The aqueous phase of the emulsion employed in the personal cleansing bar compositions of the present invention also comprises water as an essential component. The water is typically present at a level of from about 10% to about 50%, preferably from about 12% to about 45%, and most preferably from about 15% to about 35% of the personal cleansing bar compositions of the present invention.

d. Optional Ingredients

The aqueous phase of the emulsion employed in the personal cleansing bar compositions of the present invention can also contain a number of optional ingredients.

A highly preferred optional component of the present compositions are one or more humectants and solutes. A variety of humectants and solutes can be employed and can be present at a level of from about 0.1 % to about 50 %, more preferably from about 0.5 % to about 35 %, and most preferably from about 2 % to about 20 % of a non-volatile, organic material having a solubility of at least 5 parts in 10 parts water. A preferred water soluble, organic material is selected from the group consisting of a polyol of the structure:



where R1 = H, C1-C4 alkyl; R2 = H, CH<sub>3</sub> and n = 1 - 200; C2-C10 alkane diols; guanidine; glycolic acid and glycolate salts (e.g. ammonium and quaternary alkyl ammonium); lactic acid and lactate salts (e.g. ammonium and quaternary alkyl ammonium); polyhydroxy alcohols such as sorbitol, glycerol, hexanetriol, propylene glycol, hexylene glycol and the like; polyethylene glycol; sugars and starches; sugar and starch derivatives (e.g. alkoxylated glucose); panthenol (including D-, L-, and the D,L-forms); pyrrolidone carboxylic acid; hyaluronic acid; lactamide monoethanolamine; acetamide monoethanolamine; urea; and ethanol amines of the general structure (HOCH<sub>2</sub>CH<sub>2</sub>)<sub>x</sub>NH<sub>y</sub> where x = 1-3; y = 0-2, and x+y = 3, and mixtures thereof. The most preferred polyols are selected from the group consisting of glycerine, polyoxypropylene(1) glycerol and polyoxypropylene(3) glycerol, sorbitol, butylene glycol, propylene glycol, sucrose, urea and triethanol amine.

Oil thickening polymers, such as those listed in EP 0 547 897 A2 to Hewitt, published 23/06/93, incorporated herein by reference, can also be included in the bar compositions herein if the final rheology of lipid and polymer falls within the preferred range.

A preferred optional ingredient are one or more cationic and/or nonionic polymeric skin conditioning agents. A variety of polymers can be employed and can be present at a level of from about 0.1% to about 10%, and more preferably 0.25% to about 3% of a polymeric, nonionic, cationic or hydrophobically modified polymeric skin feel aid, selected from the group consisting of cationic polysaccharides of the cationic guar gum class with molecular weights of 1,000 to 3,000,000, cationic and nonionic homopolymers derived from acrylic and/or methacrylic acid, cationic and nonionic cellulose resins; cationic copolymers of dimethyldialkylammonium chloride and acrylic acid; cationic

homopolymers of dimethyldialkylammonium chloride; cationic polyalkylene and ethoxypolyalkylene imines; and mixes thereof. Examples are hydroxypropyl guar, guar hydroxypropyltrimonium chloride, polyquaternary 3, 5, 6, 7, 10, 11 and 24. In order to achieve the benefits described in this invention, the polymer must have characteristics, either structural or physical which allow it to be suitably and fully hydrated and subsequently well incorporated into the soap matrix.

A variety of additional ingredients can be incorporated into the compositions of the present invention. These materials including, but not limited to, bar appearance aids, salts and their hydrates, clays, and other "filler materials" are listed in US Pat. Application Serial No. 07/782,956 to Kacher et al, incorporated herein by reference. Examples of other suitable materials are disclosed in U.S. Patent No. 4,919,934, to Deckner et al., issued April 24, 1990; which is incorporated herein by reference.

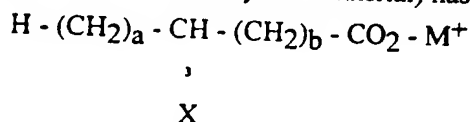
Other non limiting examples of these additional ingredients include vitamins and derivatives thereof (e.g., ascorbic acid, vitamin E, tocopheryl acetate, and the like); sunscreens; thickening agents (e.g., polyol alkoxy ester, available as Crothix from Croda); preservatives for maintaining the anti microbial integrity of the compositions; anti-acne medicaments (resorcinol, salicylic acid, and the like); antioxidants; skin soothing and healing agents such as aloe vera extract, allantoin and the like; chelators and sequestrants; and agents suitable for aesthetic purposes such as fragrances, essential oils, skin sensates, pigments, pearlescent agents (e.g., mica and titanium dioxide), lakes, colorings, and the like (e.g., clove oil, menthol, camphor, eucalyptus oil, and eugenol).

B. Rigid Semi-Continuous, Interlocking Open Mesh Crystalline Network

The personal cleansing bar compositions of the present invention also comprise from about 10% to about 50%, preferably from about 15% to about 35%, most preferably from about 15% to about 25% of a rigid, semi-continuous, interlocking open mesh crystalline network comprised of fatty acid soap. The interlocking mesh can impart strength to the three-dimensional structure, even in the presence of relatively high levels of lipid and water. The open mesh structure contains substantial "void" areas which are filled by a two phase lipid and aqueous emulsion, preferably an oil in water emulsion.

The crystalline network can comprise crystals in the form of either interlocking platelets and/or fibers, preferably fibers. Preferably said fibers are comprised of alkyl metal soaps of fatty acids having alkyl chainlengths of 8 to 24, preferably 12 to 18, more preferably 12-14 carbon atoms. The soap is preferably selected from sodium soap, magnesium soap and mixtures thereof. Sodium soap is most preferred.

The crystalline network can also comprise a mixture of fatty acid soap and monocarboxylic fatty acid. Preferably, at least 80 %, preferably 90 %, of the monocarboxylic acid (of the fatty acid material) has the following general formula:



wherein:

$$a + b = 8 \text{ to } 20$$

$$\text{each } a, b = 0 \text{ to } 20$$

$$X = \text{H, OR, O-CO-R, R, or mixtures thereof}$$

$$R = \text{C1-C3 alkyl, H, or mixtures thereof}$$

$$M = \text{Na, } (\frac{1}{2}\text{Mg}), \text{ or mixtures thereof.}$$

The above cleansing bar is more preferred when said  $a + b = 10-16$ ; each of said  $a, b = 0-16$ ; said  $X = \text{H, OR}$ ;  $R = \text{H}$ ; and  $M = \text{Na}$ . Examples of the most preferred fatty acids are: lauric acid, myristic acid, palmitic acid, stearic acid and 12 -hydroxystearic acid.

Some preferred ratios of said unneutralized (free) carboxylic acid to soap is from about 3:1 to all soap, and from about 1:2 to all soap, and a most preferred ratio is from about 1:4 to 1:10,000.

## II. Process for Preparing Lathering and Moisturizing Personal Cleansing Compositions of the Present Invention

The lathering and moisturizing personal cleansing bar compositions of the present invention can be pour-molded or stamped. Preferably, the compositions of the present invention are pour-molded according to either of the processes hereinafter described.

### A BATCH PROCESS

A combined skin moisturizing and cleansing bar can be made by a batch process described in detail as follows. First, fatty acid precursor and optionally polyol are added to a mixing vessel and heated to a temperature ranging from about 150°F to about 180°F. Water and caustic solution are then typically added and the mixture is stirred at a slow speed until a smooth aqueous molten liquid is formed. The temperature during neutralization of the molten liquid is increased to a temperature ranging from about 180°F to about 200°F. The temperature is then preferably maintained in the range of from about 170°F to about 190°F while the following ingredients are added, preferably in the order given: sodium lauroyl lactylate; sensory aids (polymers); a mixture of lathering synthetic surfactant, salt and whitening aid; and perfume. The mixture is typically stirred for a few hours until the mixture is homogeneous. Typically, make-up water is added afterward. The free fatty acid level is then measured. The free fatty acid is maintained within the range of from about 0.1 to about 5% by weight of the composition. If the free fatty acid is outside of this range it can be re-adjusted to the targeted level by either adding caustic solution or coconut fatty acid.

Separately, a lipophilic skin moisturizing agent is prepared and heated to a temperature ranging from about 145°F to about 160°F. The lipophilic skin moisturizing agent is added into the main mixing vessel containing the aqueous mixture at low agitation. The mixture is then stirred for a period of time sufficient to provide a homogeneous mixture. Finally, the mixture is poured into bar shaped molds. Upon cooling, the bars are removed from the molds and packaged.

### AN IN-LINE MIXING PROCESS

A combined skin moisturizing and cleansing bar can also be made by an in-line mixing process as hereinafter described.

A soap stream is typically prepared in the crutcher by mixing fatty acid precursor and optionally polyol and then heating to a temperature ranging from about 150°F to about 180°F. Water and caustic solution are then typically added and the mixture is stirred at a slow speed until a smooth aqueous molten liquid is formed. The temperature during neutralization of the molten liquid is increased to a temperature ranging from

about 180°F to about 200°F. The temperature is then preferably maintained in the range of from about 170°F to about 190°F while the following ingredients are added, preferably in the order given: sodium lauroyl lactylate; sensory aids (polymers); a mixture of synthetic surfactant, salt and whitening aid; and perfume. The mixture is typically stirred for a few hours until the mixture is homogeneous. Typically, water is added afterward to make-up the water loss. The free fatty acid level is then measured. The free fatty acid is desirably within the range of from about 0.1% to about 5% by weight of the composition. If the free fatty acid is outside of this range, it can be re-adjusted to the targeted level by either adding caustic solution or coconut fatty acid.

Separately, a lipid stream containing the lipophilic skin moisturizing agent is prepared and heated to a temperature ranging from about 145°F to about 160°F. This lipid stream is injected into soap stream and the streams are metered together for a period of time.

In a preferred process for preparing the bar compositions herein, the mixture is then passed through a Koch Static Mixer, such as a Koch/Sulzer SMX Mixer. The Mixer can suitably employ from 2 to 8 elements, typically welded in pairs. The number of elements selected within this range is dependent on the viscosity of the soap stream. In general, the higher the viscosity of the soap stream, the fewer the number of elements which are suitably employed.

The flow rate of the lipid and soap streams through the static mixer preferably ranges from about 500 grams/min to about 2500 grams/min, more preferably from about 1000 grams to about 2000 grams/min. Upon exiting the static mixer, the soap/lipid mixture is poured into bar shaped molds and cooled to room temperature. The bars are typically removed from the molds and packaged. Alternatively, the mold itself can serve as the package.

### III. Moisturizing and Lathering Personal Cleansing Bar Compositions

The personal cleansing bar compositions of the present invention have a Lipid Deposition Value (LDV) of at least about 10 micrograms/square centimeter, preferably at least about 20 micrograms/ square centimeter, most preferably at least about 30 micrograms/square centimeter, as measured by the Deposition Method set forth hereinafter in the Analytical Methods Section. Lipid Deposition Value is a measure of how much lipophilic skin moisturizing agent is deposited on the skin from the compositions of the present invention.

### Analytical Methods

A number of parameters used to characterize elements of the present invention are quantified by particular experimental analytical procedures. Each of these procedures are described in detail as follows:

1. Deposition of the Lipophilic Skin Moisturizing Agent- Sebumeter Method

This method for measuring the Lipid Deposition Value of a composition is used when the Lipid Deposition Value is less than about 300 micrograms/square centimeter. At Lipid Deposition Values above about 300 micrograms/square centimeter, the Sebumeter tape becomes saturated and the Extraction Method hereinafter described should be used.

A. Preparation

The subject wets the entire surface of the inner forearm with 95-100°F (35°C-38°C) water. The technician, using exam gloves, wets the appropriate bar with tap water and then rotates the bar in both hands for (10) seconds to generate lather. The technician then rubs the bar on the inner forearm from the wrist to the elbow and back down again for 20 seconds (i.e., exactly 20 rubs up and 20 rubs down). The bar is then set aside and the subject's forearm is rubbed by the technician for ten seconds by rubbing the gloved hand up and down the subject's inner forearm, again from elbow to wrist. The lather is allowed to remain on the forearm for fifteen seconds, followed by a thorough rinse for fifteen seconds. After rinse, the technician gently pats the forearm dry with a disposable paper towel. The process is repeated one more time for a total of two washes.

B. Deposition Protocol- Sebumeter

Deposition of the lipophilic skin moisturizing agent on the skin is measured using a a Sebumeter SM810 which is commercially available from Courage and Khazaka GmbH. The Sebumeter measures the amount of lipophilic skin moisturizing agent that has been deposited on the skin via photometry of a special plastic strip, which becomes transparent when it absorbs the lipophilic skin moisturizing agent. The plastic strip is extended over a mirror which is connected to a spring. The measuring head of the device (comprised of spring, mirror and plastic strip) is pressed against the skin for 30 seconds. The Deposition Value ( $\mu\text{g/sq. cm}$ ) is indicative of the amount of lipophilic skin moisturizing agent on the skin; the Deposition Value increases with increased amount of lipophilic skin moisturizing agent. The method is insensitive to humidity. Sebumeter readings (3) are taken along the length of the forearm and the Deposition Value ( $\mu\text{g/sq. cm}$ ) is defined as the mean of the 3 readings, divided by a conversion factor to translate the sebumeter readings to actual deposition levels in  $\mu\text{g/sq. cm}$ .



The Sebumeter has the following limitations:

1. The Sebumeter tape also detects natural skin lipids. A criterion of this test is that subjects baseline value measured on the Sebumeter, prior to washing, be less than or equal to 3  $\mu\text{g/sq. cm}$  of forearm skin.
2. The Sebumeter like other surface extraction measurements may not measure all the deposited lipophilic skin moisturizing agent; if the skin topography is undulating it is possible that deposited lipophilic skin moisturizing agent may not be extracted by the Sebumeter tape.
3. The Sebumeter tape becomes saturated at a Deposition Value of above about 300  $\mu\text{g/sq. cm}$ ; so this method can only measure deposition values up to about 300  $\mu\text{g/sq. cm}$ .
4. Different lipophilic skin moisturizing agents will have different conversion factors. For testing non-petrolatum lipids, a new calibration curve is required.

C. Calibration

To translate the Sebumeter data obtained as hereinbefore described into deposition data, it is necessary to generate a conversion factor. To generate the conversion factor, an extraction is done for each lipid system and the extracted sample is analyzed by gas chromatography. The extraction is done at the same time as the Sebumeter reading and is taken from the same forearm. The extraction procedure is as follows:

- 1) An open-ended glass cylinder (2 inches in diameter) is placed onto the subject's inner forearm and securely strapped in place.
- 2) Five ml of extraction solvent is added to the cylinder.
- 3) The liquid is stirred on the subject's arm for 30 seconds using a blunt-ended glass stirring rod. The full surface area of the enclosed forearm is treated with solvent.
- 4) The liquid is transferred to a 6 dram vial using a disposable transfer pipet.
- 5) Steps 2-5 are repeated two times (total of three samples, 15 ml of solvent collected)

The extracted sample is then analyzed by gas chromatography as follows:

**APPARATUS**

Gas Chromatograph	HP 5890 or equivalent equipped with capillary inlet system and flame ionization detector.
Integration System	PEN Turbochrom v4.0 data system, or HP 3396 Series II integrator, or equivalent with peak-grouping capability.
Column	DB-5ht, 30 M x 0.32 mm I.D., 0.10 $\mu$ m film thickness, J&W Scientific cat. no. 123-5731.
Analytical Balance	Capable of weighting to 0.0001 g.
Pipet	1 mL, Class A.
Volumetric Flask	1000 mL, 100 mL, glass stoppered.
Glass Syringe	100 $\mu$ L capacity
Autosampler Vials	With crimp-top caps
Dry Bath	Regulated at 80 - 85°C
Pipettor	Eppendorf Repeater with 12.5 mL reservoir
Stir Plate and Stir Bars	Teflin-coated stir bars

**REAGENTS**

Heptane	ACS grade.
Squalane	Aldrich cat. no. 23,431-1 or equivalent.
Lipid Standard	

**GC CONDITIONS**

Carrier Gas	Helium UHP grade or regular grade helium purified through a dry tube and an oxygen scrubber. Flow pressure regulated at 25 psi with 25 ml/min split.
Injection Mode	Splitless
Injection Volume	2 $\mu$ l

Injector Temperature	310°C
Oven Temperature Program	100°C for 0 minutes @ 10°C/min. to 350°C; hold for 6 min.
Detector Temperature	350°C
Hydrogen and Air Flows	Optimized for gas chromatograph used.
Bunching Factor	2

### SOLUTIONS

Internal Standard Solution	Into a clean, dry 100 mL volumetric flask, analytically weight 0.1 g of squalane, recording weight to nearest 0.0002 g. Dilute to volume with heptane, stopper and stir to dissolve. (A 1:1000 dilution of this solution can be used as the extraction solvent when generating samples.)
Lipid Stock Solution	Into a clean, dry 100 ml volumetric flask, analytically weight 0.5 gram of lipid standard, recording weight to nearest 0.0002 g. Dilute to volume with heptane, stopper and stir to mix.
Lipid Working Standards	Label three autosampler vials as follows: "100 µg," "300 µg" and "500 µg." Using the glass syringe, transfer 15 µL of internal standard solution into each vial. Rinse syringe well with heptane, then use it to transfer the following amounts of lipid stock solution to the vials:

<u>Std.</u>	<u>Vol. Stock Soln. (µL)</u>
100 µg	20
300 µg	60
500 µg	100

Dilute to approx. 0.5 mL with heptane, then cap and shake to mix.

## OPERATION

1. Calibration      Run each standard under the above conditions. Select the 10-14 largest peaks from the calibration run and create a peak group within the calibration of the method. Assign the amount of lipid in the standard to the group for each calibration level. Plot the area ratio on the y-axis. Do not force the line through the origin or include the origin. The  $r^2$  value should be at least 0.9990. Check calibration every ten or twelve samples and at the end of the sample run.
2. Sample Analysis      Evaporate samples to dryness under a stream of dry nitrogen. Reconstitute in 0.5 mL heptane. Cap tightly and place on dry bath for 5 minutes; shake to dissolve completely. Transfer to autosampler vials and analyze on calibrated instrument with the proper ISTD amount entered. Important: Because the baseline is cluttered, manually check each result file for correct peak identification.

The GC data is then plotted on a curve versus the Sebumeter data. The slope of the curve is the conversion factor. The conversion factor for petrolatum is 0.56.

### 2. Deposition of Lipophilic Skin Moisturizing Agent-Extraction Method

If the Lipid Deposition Value is expected to be in excess of 300 micrograms/square centimeter, this method should be used. This method uses a solvent extraction protocol similar to that described in Journal Society of Cosmetic Chemists of Great Britain, Volume 21 (pp. 521-532) 1970.

An extraction cup is firmly attached to the forearm and heptane is poured in the cup, such that the heptane is in contact with the forearm. The solvent extract containing the lipophilic skin moisturizing agent is analyzed by standard gas chromatographic methods.

### 3. Determination of Consistency, k, and Shear index, n, of a Lipophilic Skin Moisturizing Agent

The Carrimed CSL 100 Controlled Stress Rheometer is used to determine Shear Index, n, and Consistency, k, for a lipophilic skin moisturizing agent or mixture of lipophilic skin moisturizing agents. The determination is performed at 35°C with the 4 cm 2° cone measuring system typically set with a 51 micron gap and is performed via the programmed application of a shear stress (typically from about 0.06 dynes/sq. cm to about 5,000 dynes/sq. cm) over time. If this stress results in a deformation of the sample,

i.e. strain of the measuring geometry of at least  $10^{-4}$  rad/sec, then this rate of strain is reported as a shear rate. These data are used to create a viscosity  $\mu$  Vs. shear rate  $\dot{\gamma}$  flow curve for the material. This flow curve can then be modeled in order to provide a mathematical expression that describes the material's behavior within specific limits of shear stress and shear rate. These results are fitted with the following well accepted power law model (see for instance: Chemical Engineering, by Coulson and Richardson, Pergamon, 1982 or Transport Phenomena by Bird, Stewart and Lightfoot, Wiley, 1960):

$$\text{Viscosity, } \mu = k (\dot{\gamma})^{n-1}$$

4. Determination of Elastic Modulus,  $G'$ , and Viscous Modulus,  $G''$

The Carrired CSL 100 Controlled Stress Rheometer is used to perform oscillatory tests at  $35^{\circ}\text{C}$  with the 4 cm  $2^{\circ}$  cone measuring system typically set with a 51 micron gap. The oscillatory tests at  $35^{\circ}\text{C}$  are carried out in 2 steps. The first step is a stress amplitude sweep at the expected starting and ending frequencies for the frequency sweep. These tests allow a determination to be made as to whether or not the test conditions are within the linear viscoelastic region for the test material over the anticipated frequency range. The linear viscoelastic region is a region where there is a linear relationship between stress and strain. The second step is a frequency sweep made at a stress level within that linear viscoelastic region. The frequency sweep allows the test material's viscoelastic behavior to be measured. The oscillatory test on a controlled stress rheometer is performed by applying a stress in an oscillatory manner and measuring the resulting oscillatory strain response and the phase shift between the applied stress wave form and the resulting strain wave form in the test material. The resulting complex modulus is expressed as a combination of the material's elastic ( $G'$ ) and viscous ( $G''$ ) components:

5. Determination of Free Fatty Acid of Sample

- a. Weigh about 6.5 grams of the sample into a round bottom flask.
- b. Add about 150 ml of 95/5 ethanol/water mixture neutralized with sodium hydroxide.
- c. Heat and stir solution until the sample is dissolved.
- d. Place sample on Mettler DL0 autotitrator.
- e. Titrate sample with 0.5N NaOH until equivalence point is reached.
- f. Report result as wt% FFA. If the sample is a crutcher sample, correct for the later addition of lipophilic skin moisturizing agent to batch.

6. Determination of % Nonspherical Lipophilic Skin Moisturizing Agent Particles

A stereo scope (Zeiss) is utilized to determine the weight % nonspherical particles in the lather of the personal cleansing bar. The personal cleansing bar is lathered under warm tap water (95-100°F). a drop of concentrated lather is then applied to a microscope slide. The slide is observed under bright-field illumination at about 20x magnification. The number of nonspherical particles is counted. the weight % nonspherical particle is determined by dividing the number of nonspherical particles by the total number of particles.

7. Emulsion Stability Centrifuge Test

The following test is used to determine the degree of stability of an emulsion which contains a moisturizing phase and an aqueous cleansing phase.

A ten percent (10%) solution of the bar composition is made by weighing 10 grams of the bar, finely chopped, to 120°F city water. The solution is stirred overnight (18 hours) using a magnetic stir plate and 1/2" stir bar.

The stirred sample is then centrifuged for 150 minutes at 10,000 RPM and 25°C using a Beckman L8-80-R60 Ultracentrifuge with a SW-40 rotor. If the emulsion is suitably unstable for use in the bars of the present invention, a lipid top layer is observed. Emulsion which do not exhibit a top lipid layer are too stable for use herein.

8. Bar Lather Test

The hand wash lather test is used to provide in-use lather volume measurements for the lather performance of skin cleansing bars. The test measures the lather volume generated under a soil load. Synthetic soil is used for the test reported herein. Its formula is reported in US 4,673,525 to Small et al. issued June 16th 1987, incorporated herein by reference.

9. Bar Hardness Test

1. The hardness of a bar is determined by measuring at 25°C the depth of penetration (in mm) into the bar of a 247 gram Standard Weighted Penetrometer Probe having a conical shaped needle attached to a 22.9 cm (9 inch) shaft weighing 47 grams with 200 grams on top of said shaft. A hardness measurement of 5 mm or less indicates a very hard bar; 5-12 mm indicates a moderately hard bar. This defines "hardness" as used herein unless otherwise specified.

**THE EXAMPLES**

The following are nonlimiting examples of the personal cleansing bar compositions of the present invention. Examples A-D are prepared according to the Batch process hereinbefore described. Example E is prepared according to the In-Line process hereinbefore described.

**Example A**

<b><u>Ingredients</u></b>	<b><u>wt%</u></b>
Sodium Myristic Soap	14.9
Coconut Soap	1.1
Sodium Cocoyl Isethionate	22.0
Sodium Lauroyl Lactylate	2.5
Glycerin	12.4
Propylene Glycol	3.0
Polyquaternium-10 (Jr-30M)	0.1
Merquat polymer 550	0.3
Silicone 200	2.0
Petrolatum	7.0
Soybean Oil	7.0
Sodium Chloride	1.7
Titanium Oxide	0.2
Free Fatty Acid	1.06
Water	W.Q.

**Performance Results**

Hardness (mm)	8.2
Lather Flash Volume	4.0
Lather Ult. Volume	4.5
Lather Creaminess	6.5
Lipid Deposition	134

**Example B**

<b><u>Ingredients</u></b>	<b><u>wt%</u></b>
Sodium Myristic Soap	14.9
Coconut Soap	1.1
Sodium Cocoyl Isethionate	19.5
Sodium Lauroyl Lactylate	5.0

Glycerin	12.4
Propylene Glycol	3.0
Polyquaternium-10 (Jr-30M)	0.1
Merquat polymer 550	0.3
Silicone 200	2.0
Petrolatum	7.0
Soybean Oil	7.0
Sodium Chloride	1.7
Titanium Oxide	0.2
Perfume	0.5
Free Fatty Acid	1.43
Water	W.Q.

**Performance Results**

Hardness (mm)	7.5
Lather Flash Volume	5.0
Lather Ult. Volume	5.0
Lather Creaminess	6.5
Lipid Deposition	106

**Example C****Ingredients**

	<b><u>wt%</u></b>
Sodium Myristic Soap	11.4
Coconut Soap	1.1
Sodium Lauric Soap	3.5
Sodium Cocoyl Isethionate	22.0
Sodium Lauroyl Lactylate	2.5
Glycerin	12.4
Propylene Glycol	3.0
Polyquaternium-10 (Jr-30M)	0.1
Merquat polymer 550	0.3
Silicone 200	2.0
Petrolatum	7.0
Soybean Oil	7.0
12-Hydroxyl Stearic Acid	0.3
Sodium Chloride	1.7



Titanium Oxide	0.2
Perfume	0.5
Free Fatty Acid	1.27
Water	W.Q.

**Performance Results**

Hardness (mm)	7.5
Lather Flash Volume	6.0
Lather Ult. Volume	6.5
Lather Creaminess	7.5
Lipid Deposition	134

**Example D****Ingredients**

	<b><u>wt%</u></b>
Sodium Myristic Soap	11.3
Coconut Soap	1.7
Sodium Lauric Soap	3.0
Sodium Cocoyl Isethionate	22.0
Sodium Lauroyl Lactylate	2.5
Glycerin	12.4
Propylene Glycol	3.0
Polyquaternium-10 (Jr-30M)	0.4
PEG 14M	0.1
Petrolatum	7.0
Soybean Oil	7.0
Sodium Chloride	1.7
Titanium Oxide	0.2
Free Fatty Acid	1.53
Water	W.Q.

**Performance Results**

Hardness (mm)	6.3
Lather Flash Volume	6.0
Lather Ult. Volume	6.5
Lather Creaminess	7.5
Lipid Deposition	192

**Example E**

<b><u>Ingredients</u></b>	<b><u>wt%</u></b>
Sodium Myristic Soap	11.3
Coconut Soap	1.7
Sodium Lauric Soap	3.0
Sodium Cocoyl Isethionate	22.0
Sodium Lauroyl Lactylate	2.5
Glycerin	12.4
Propylene Glycol	3.0
Polyquaternium-10 (Jr-30M)	0.4
PEG 14M	0.1
Petrolatum	7.0
Soybean Oil	7.0
Sodium Chloride	1.7
Titanium Oxide	0.2
Free Fatty Acid	1.57
Water	W.Q.

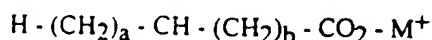
**Performance Results**

Hardness (mm)	6.1
Lather Flash Volume	5.0
Lather Ult. Volume	5.5
Lather Creaminess	7.5
Lipid Deposition	112

**What Is Claimed Is:**

1. A lathering and moisturizing personal cleansing bar composition characterized in that it comprises:
  - (a) an unstable emulsion comprising:
    - (i) a moisturizing phase comprising from 5 parts to 40 parts by weight of the bar composition of a lipid skin moisturizing agent having a Vaughan Solubility Parameter ranging from 5 to 10 and a consistency of less than 5,000 poise; and
    - (ii) a cleansing phase comprising from 1 part to 50 parts by weight of the bar composition of a surfactant comprising a lathering synthetic surfactant, from 0.5% to 40% by weight of the bar composition of a cosurfactant comprising sodium lauroyl lactylate, and from 10 parts to 50 parts water; and
  - (b) from 10 parts to 50 parts of a rigid semi-continuous, interlocking open mesh crystalline network structure;  
wherein said unstable emulsion is contained within interstices of said open mesh crystalline network.
2. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein the bar composition has a Lipid Deposition Value of at least 10 micrograms/ square centimeter.
3. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein the bar composition is pour-molded.
4. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein said crystalline network structure consists essentially of a fatty acid soap or a mixture of fatty acids soaps having at least 75% saturated alkyl chains, said alkyl chains comprising from 8 to 22 carbon atoms.
5. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein the bar composition comprises from 1% to 20% by weight of sodium lauroyl lactylate cosurfactant.

6. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein at least 80 % of said fatty acid soap has the following structure:



X

wherein:

$$a + b = 8 \text{ to } 20$$

$$\text{each } a, b = 0 \text{ to } 20$$

X = H, OR, O-CO-R, R, or mixtures thereof

R = C1-C3 alkyl, H, or mixtures thereof

M = Na, ( $\frac{1}{2}$ Mg), or mixtures thereof; and;

wherein said fatty acid soap comprises from 15 to 40 parts by weight of the bar composition; and wherein said fatty acid soap has at least 85 % saturated alkyl chains; and wherein 80 % to 100 % of said saturated alkyl chains are selected from the group consisting of 12 to 18 carbon atoms chains.

7. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein said cleansing phase comprises from 5 to 40 parts by weight of the bar compositions of a lathering synthetic surfactant and from 15 to 45 parts by weight of the bar composition of water, wherein said lathering synthetic surfactant is selected from the group consisting of anionic surfactants; nonionic surfactants, amphoteric surfactants, and mixtures thereof; and wherein said lathering synthetic surfactant has a critical micelle concentration equilibrium surface tension value of from 15 to 50 dynes per cm at 25°C.

8. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein said moisturizing phase comprises from 10 to 35 parts by weight of the bar composition of a lipophilic skin moisturizing agent, and wherein said bar composition has a Lipid Deposition Value of at least 50 micrograms/square centimeter.

9. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims wherein said lipid skin moisturizing agent is selected from the group consisting of: hydrocarbon oils and waxes, silicone oils, di and tri-glyceride fats and oils, acetoglyceride esters, alkyl esters, alkenyl esters, polyol fatty acid

polyesters, lanolin and its derivatives, wax esters, beeswax derivatives, vegetable waxes, sterols, phospholipids, and mixtures thereof.

10. A lathering and moisturizing personal cleansing composition according to any one of the preceding claims which contains from 0.1% to 5% free fatty acid.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 97/22575

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C11D17/00 C11D10/04 A61K7/48

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C11D A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 95 26710 A (PROCTER & GAMBLE) 12 October 1995 see claims; examples	1-4,6-10
A	WO 92 09679 A (PROCTER & GAMBLE) 11 June 1992 see claims; examples; tables 5-11	1,3,4,6,9,10
A	US 5 540 854 A (FAIR MICHAEL J ET AL) 30 July 1996 see claims; examples	1,3,5,9
A	US 4 198 311 A (BAIOCCHI FRED ET AL) 15 April 1980 see claims; example 2	1,5,6
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"A" document member of the same patent family

Date of the actual completion of the international search

27 May 1998

Date of mailing of the international search report

10/06/1998

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl.  
Fax: (+31-70) 340-3016

Authorized officer

Grittern, A

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 97/22575

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 857 960 A (MACKLES L) 31 December 1974 see claims; examples 1-5 ---	1,5,9
A	US 5 547 602 A (SCHULER WILLIAM H) 20 August 1996 see claims; example 1 ---	1,9
A	DATABASE WPI Section Ch, Week 9210 Derwent Publications Ltd., London, GB; Class A96, AN 92-077304 XP002066034 & JP 04 023 900 A (KAO CORP) see abstract -----	1,5

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/22575

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9526710 A	12-10-1995	AU 1975895 A	23-10-1995
		BR 9507236 A	16-09-1997
		CA 2185667 A	12-10-1995
		CN 1145026 A	12-03-1997
		CZ 9602867 A	12-03-1997
		EP 0752846 A	15-01-1997
		FI 963876 A	27-09-1996
		HU 75203 A	28-04-1997
		JP 9511248 T	11-11-1997
		NO 964077 A	02-12-1996
		PL 316622 A	20-01-1997
WO 9209679 A	11-06-1992	US 5340492 A	23-08-1994
		AT 129522 T	15-11-1995
		AU 657295 B	09-03-1995
		AU 9176391 A	25-06-1992
		CA 2095351 A	27-05-1992
		CN 1062759 A	15-07-1992
		CZ 9300987 A	13-07-1994
		DE 69114143 D	30-11-1995
		DE 69114143 T	25-04-1996
		DK 559837 T	04-03-1996
		EG 19580 A	30-08-1995
		EP 0559837 A	15-09-1993
		ES 2079180 T	01-01-1996
		FI 932366 A	25-05-1993
		HU 76489 A	29-09-1997
		IE 72087 B	12-03-1997
		JP 6503122 T	07-04-1994
		NZ 240709 A	27-04-1995
		PT 99606 A	30-10-1992
		RU 2080365 C	27-05-1997
		SK 52693 A	12-01-1994
US 5540854 A	30-07-1996	AU 5688396 A	18-11-1996
		CA 2211362 A	31-10-1996
		WO 9634083 A	31-10-1996
		EP 0824582 A	25-02-1998
US 4198311 A	15-04-1980	JP 55040666 A	22-03-1980



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/22575

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3857960	A	31-12-1974	CA 1020091 A	01-11-1977
US 5547602	A	20-08-1996	NONE	